

# Claims

- [c1] 1. A latch-free button structure for an electronic device having at least a housing, a button cover and a circuit board, wherein the circuit board is enclosed inside the housing and the button is positioned between the button cover and the housing, the button comprising:
- a body;
  - a wing plate having a top end joined to the side edges of the button body with the wing plate arcing down from the junction;
  - a positioning plate lying flat on an outer surface of the housing and attached to the lower end of the wing plate;
  - and
  - a contact rod attached to the bottom section of the button body, wherein height from the bottom of the contact rod to the contact point on the circuit board is B, height from the bottom section of the button body to the outer surface of the housing is C, height of the wing plate is A, height of the sidewall of the button cover next to the button body is D and height from the top of the button body to the top end of the wing plate is E, and a relationship between A, B, C, D, E is set to have  $EB > D$ .

- [c2] 2. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $E - D > A$ .
- [c3] 3. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $D > A$ .
- [c4] 4. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $A \geq C$ .
- [c5] 5. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $A \geq B$ .
- [c6] 6. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $C \geq B$ .
- [c7] 7. The button structure of claim 1, wherein the body, the wing plate, the positioning plate and the contact rod are manufactured together as an integrative unit.
- [c8] 8. The button structure of claim 1, wherein the button body and the contact rod are separately fabricated and then assembled together thereafter.
- [c9] 9. The button structure of claim 1, wherein the wing plate is elastic and capable of returning the button body to its original configuration after releasing from a pressed position.
- [c10] 10. A design method for producing a latch-free button

inside an electronic device having at least a housing, a button cover and a circuit board, wherein the circuit board is enclosed inside the housing and the button is positioned between the button cover and the housing, the button comprising:

a body;

a wing plate having a top end joined to the side edges of the button body with the wing plate arcing down from the junction;

a positioning plate lying flat on an outer surface of the housing and attached to the lower end of the wing plate; and

a contact rod attached to the bottom section of the button body, wherein height from the bottom of the contact rod to the contact point on the circuit board is B, height from the bottom section of the button body to the outer surface of the housing is C, height of the wing plate is A, height of the sidewall of the button cover next to the button body is D and height from the top of the button body to the top end of the wing plate is E, and the design method for the button includes:

tailoring the dimensions of A, B, C, D, E such that a relationship is set to have  $EB > D$ .

[c11] 11. The design method of claim 10, wherein the relationship between A, B, C, D, E is further set to have  $E - D$

> A.

[c12] 12. The button structure of claim 10, wherein the relationship between A, B, C, D, E is further set to have  $D > A$ .

[c13] 13. The button structure of claim 10, wherein the relationship between A, B, C, D, E is further set to have  $A \geq C$ .

[c14] 14. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $A \geq B$ .

[c15] 15. The button structure of claim 1, wherein the relationship between A, B, C, D, E is further set to have  $C \geq B$ .

[c16] 16. A design method for producing a latch-free button inside an electronic device having at least a housing, a button cover and a circuit board, wherein the circuit board is enclosed inside the housing and the button is positioned between the button cover and the housing, the button comprising:  
a body;  
a wing plate having a top end joined to the side edges of the button body with the wing plate arcing down from the junction;

a positioning plate lying flat on an outer surface of the housing and attached to the lower end of the wing plate; and

a contact rod attached to the bottom section of the button body, and the design method for the button includes:

tailoring the button structure such that the top end of the button body always remains above the top surface of the button cover while the body of the button travels the entire permissible range of movement; and

tailoring the button structure such that the total amount of deformation in the wing plate always remains below the height of the wing plate while the body of the button travels the entire permissible range of movement.